

COLORADO
DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
STATE HIGHWAY NO. C-470
Colorado Project Number NH 4701-122
Project Code 18449

The 2011 Standard Specifications for Road and Bridge Construction controls construction of this project. The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

PROJECT SPECIAL PROVISIONS

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DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
Project NH 4701-122
STANDARD SPECIAL PROVISIONS

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NOTICE TO BIDDERS

The proposal guaranty shall be a certified check, cashier's check, or bid bond in the amount of 5 percent of the Contractor's total bid.

Pursuant to subsections 102.04 and 102.05, it is recommended that bidders on this project review the work site and plan details with an authorized Department representative. Prospective bidders shall contact one of the following listed authorized Department representatives at least 12 hours in advance of the time they wish to go over the project.

Program Engineer -	Paul Jesaitis Office Phone:	303-757-9388
Resident Engineer -	Ron Buck Office Phone:	303-512-5450
Project Engineer -	As designated by the Resident Engineer	

The above referenced individuals are the only representatives of the Department with authority to provide any information, clarification, or interpretation regarding the plans, specifications, and any other contract documents or requirements.

Questions received from bidders along with CDOT responses will be posted on the CDOT web site listed below as they become available.

http://www.dot.state.co.us/Bidding/ads_and_ebs.htm

If the bidder has a question or requests clarification that involves the bidder's innovative or proprietary means and methods, phasing, scheduling, or other aspects of construction of the project, the Project Engineer will direct the bidder to contact the Resident Engineer directly to address the question or clarification. The Resident Engineer will keep the bidder's innovation confidential and will not share this information with other bidders.

The Resident Engineer will determine whether questions are innovative or proprietary in nature. If the Resident Engineer determines that a question does not warrant confidentiality, the bidder may withdraw the question. If the bidder withdraws the question, the Resident Engineer will not answer the question and the question will not be documented on the CDOT web site. If the bidder does not withdraw the question, the question will be answered, and both the question and CDOT answer will be posted on the web site. If the Resident Engineer agrees that a question warrants confidentiality, the Resident Engineer will answer the question, and keep both question and answer confidential. CDOT will keep a record of both question and answer in their confidential file.

All questions shall be directed to the CDOT contacts listed above no later than 7:00 A.M. Monday of the week of bid opening. Final questions and answers will be posted no later than Tuesday morning of bid opening week.

Questions and answers shall be used for reference only and shall not be considered part of the Contract.

COMMENCEMENT AND COMPLETION OF WORK

The Contractor shall commence work under the Contract on May 6, 2013 unless such time for beginning the work is changed by the Chief Engineer in the "Notice to Proceed." The Contractor shall complete all work within 70 working days in accordance with the "Notice to Proceed."

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03 shall include the following:

The Contractor's progress schedule may be a Bar Chart Schedule.

Salient features to be shown on the Contractor's Bar Chart Progress Schedule are:

- (1) Erosion and Sediment Control
- (2) Removal of Asphalt Pavement (Planing) – C470
- (3) Removal of Asphalt Pavement (Planing) - Wadsworth
- (4) Stone Matrix Asphalt
- (5) HMA (SX)(100)(PG 76-28)
- (6) Signing
- (7) Final Striping

Subsection 108.08 shall include the following:

Time will not be charged during the months of December, January, February or March. This time is defined as free time and work may continue if conditions permit.

CONTRACT GOAL (COMBINED)

The Department has determined that Underutilized Disadvantaged Business Enterprises (UDBEs) will participate by contracting for a part of the work of this Contract. The contract goal for participation in this Contract by certified DBEs who have been determined to be underutilized has been established as follows:

UDBE* **11** Percent

The percentage will be calculated from proposals received for this project according to the following formula:

$$\text{Percentage} = 100 \times \frac{\text{**Dollar amount of work to be contracted to underutilized DBEs (UDBEs)}}{\text{Total dollar amount of the original Contract}}$$

* All DBEs will be considered to be UDBEs.

** Based on DBE contract unit prices rather than prime contract unit prices.

NOTE: Specific Good Faith Efforts required to meet the Contract Goal specified above are defined in the Standard Special Provisions. In addition, the Transportation Commission has determined an overall 12.69 percent annual goal for the participation of all DBEs.

ON THE JOB TRAINING CONTRACT GOAL

The Department has determined that On the Job Training shall be provided to trainees with the goal of developing full journey workers in the types of trade or classification involved. The contract goal for On the Job Trainees working in an approved training plan in this Contract has been established as follows:

Minimum number of total On the Job Training required **320** hours

**REVISION OF SECTION 102
PROJECT PLANS AND OTHER DATA**

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Subsection 102.05 shall include the following:

After the proposals have been opened, the low responsible bidder may obtain from CDOT's Printing and Visual Communications Center, 4201 East Arkansas Avenue, Denver, Colorado 80222, at no cost: 10 sets of plans and special provisions; and if available for the project, one set of full-size cross sections, one set of full-size major structure plan sheets, and one set of computer output data. If the low bidder has not picked up the plans and other available data by 4:30 p.m. on the second Friday after bid opening, they will be sent to the Resident Engineer in charge of the project. Additional sets of plans and other available data may be purchased on a cash sale basis from CDOT's Visual Communication Center at current reproduction prices. Subcontractors and suppliers may obtain plans and other data from the successful bidder or they may purchase copies on a cash sale basis from the Visual Communication Center at current reproduction prices.

**REVISION OF SECTION 106
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT**

Section 106 of the Standard Special Provisions is hereby revised for this project as follows:

Subsection 106.05 shall include the following:

For this project, Contractor process control testing of hot mix asphalt is mandatory.

**REVISION OF SECTION 107
NOISE PROVISIONS**

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.06 shall include the following:

The Contractor shall comply with all Local Agency (s) noise ordinances and/or other restrictions applicable to nighttime construction activities for projects within the local municipal coverage areas. Projects falling within unincorporated areas of a County will be governed by County Code. The Contractor shall coordinate with the Local Agency (s) and/or CDOT for all necessary noise exemptions or notices, noise permit variances, and approvals to do night work as required. If Local Agency nighttime noise restrictions do not exist and there are noise sensitive receptors in the project area, the approvals to do nighttime work shall be approved through the CDOT engineer. Standard noise controls and best management practices for reducing equipment and construction activity noise levels shall be utilized in all cases and will be the responsibility of the contractor to consistently employ when working in noise sensitive areas after 9 p.m.

For this project, the Contractor is required to review and understand all local agency ordinances with project applicable night restrictions. When conditions apply, the contractor shall submit a nighttime noise ordinance memorandum (s) to all jurisdictional local authorities. This memorandum shall request construction noise exemptions for night work operations (at least two weeks prior to the proposed night work start date) where construction work is scheduled between the hours of 9:00 p.m. and 7:00 a.m. The following information should be included in the exemption request submittals and sent to the City/County Engineer: (1) Requesting entity, (2) Contact person and phone number, (3) Location of the work, (4) Reasons night work is being requested, (5) Type of activities proposed to occur at night, (6) Equipment proposed to be used at night, (7) Start and end date proposed, (8) Total number of nights work is proposed to occur.

All nighttime construction activities subject to noise level restrictions cannot begin until necessary documentation and notifications have been approved by the local agency authority, the CDOT Engineer and/or the Region's Noise Specialist. All foregoing requirements including exemption requests and permitting requirements will not be paid for separately, but will be included in the work

**REVISION OF SECTION 107
PROTECTION OF EXISTING VEGETATION**

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.12 shall include the following:

The Contractor shall save all existing vegetation (including trees, shrubs, ground covers, grasses, wetlands & riparian) in this area, except for that vegetation, which must be removed to accommodate construction of the project, per the plans. Specific areas of vegetation to be protected shall be as directed by the Engineer and shall be protected by using orange construction fencing, wire fencing with metal posts or silt fence. Fencing for trees shall be installed at the drip line of the tree or as approved by the Engineer. Equipment shall not be installed or stockpile material within 15 feet of existing trees to remain.

The Contractor shall perform all the work in such a manner that the least environmental damage will result. All questionable areas or items shall be brought to the attention of the Engineer for approval prior to removal or any damaging activity.

The Contractor shall promptly report any vegetation damaged or scarred during construction to the Engineer for assessment of damages. Damaged or destroyed fenced vegetation, shall be replaced at the expense of the Contractor. Vegetation of replaceable size shall be replaced at the Contractor's expense. When trees, shrubs beyond replaceable size or wetlands have been damaged or destroyed, the Contractor shall be liable for the appraised value based upon the official current publications. For trees and shrubs use the International Society of Arboriculture, Guide for Plant Appraisals. The Contractor shall pay any fines or jail time should a wetland be damaged, at no cost to the project. The value of disturbed vegetation shall be calculated according to the following formula:

$$(\text{Vegetation size}) \times (\text{Species}) \times (\text{Location}) \times (\text{Condition}) \times (\text{Arborist or Wetland Specialist}) = \text{Vegetation value}$$

A consulting Arborist retained by the Department will determine the value of the trees and shrubs. A consulting Wetland Specialist shall determine the value of the wetland or wetland species. This value will be deducted from any money due to the Contractor.

The determination as to whether a plant is of replacement size or beyond will be made by the Department's Landscape Architect or Wetland Specialist.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is repaired to the Engineer's satisfaction at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

**REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT (PLANING)**

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 202.09, and replace with the following:

202.09 Removal of Asphalt Mat (Planing). Prior to beginning planing operations, the Contractor shall submit a planing plan and a Quality Control Plan (QCP) for approval by the Engineer. The planing plan shall include at a minimum:

- (1) The number, types and sizes of planers to be used.
- (2) The width and location of each planing pass.
- (3) The number and types of brooms to be used and their locations with respect to the planers.
- (4) The proposed method for planing and wedging around existing structures such as manholes, valve boxes, and inlets.
- (5) The longitudinal and transverse typical sections for tie-ins at the end of the day.
- (6) If requested by the Engineer, a plan sheet showing the milling passes.

The QCP shall include as a minimum:

- (1) The schedule for replacing the cutting teeth.
- (2) The daily preventive maintenance schedule and checklist.
- (3) Proposed use of automatic grade controls.
- (4) The surface testing schedule for smoothness.
- (5) The process for filling distressed areas.
- (6) The schedule for testing macrotexture of the milled surface.
- (7) Corrective procedures if the milled surface does not meet the minimum macrotexture specification.
- (8) Corrective procedures if the milled surface does not meet the minimum transverse or longitudinal surface finish when measured with a 10 foot straightedge.

The Contractor shall not start the planing operation until the hot mix asphalt (HMA) mix design has been approved and a Form 43 has been signed by the Engineer.

The existing pavement shall be milled to the cross-slope as shown on the plans, and shall have a surface finish that does not vary longitudinally or transversely more than 3/8 inch from a 10 foot straightedge. A 10 foot straightedge shall be supplied by the Contractor.

All milled surfaces shall be broomed with a pick-up broom, unless otherwise specified, before being opened to traffic. A sufficient number of brooms shall be used immediately after planing to remove all milled material remaining in the roadway.

2
REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT (PLANING)

If the Contractor fails to adequately clean the roadway, work shall cease until the Engineer has approved the Contractor's revised written proposal to adequately clean the roadway.

The milled surface shall have a macrotexture equal to or less than 0.170 inches for single-lift overlays and 0.215 inches for multiple-lift overlays as tested in accordance with CP 77. Milled surfaces that do not meet these criteria shall require corrective action in accordance with the QCP. The Contractor shall be responsible for testing the macrotexture of the milled surface at the location directed by the Engineer in accordance with CP 77 at a stratified random frequency of one test per 10,000 square yards or a minimum of once per work day.

At the completion of each day's work, longitudinal vertical edges greater than 1 inch shall be tapered. No transverse vertical edges will be allowed. Longitudinal milled surface tie-ins to existing pavement shall be tapered to not less than a 3:1 slope, transverse milled surface tie-ins to existing pavement shall be tapered to not less than a 50:1 slope. Transverse tapered joints may be tapered with the planing machine, a temporary asphalt ramp, or other methods approved by the Engineer. No longitudinal joint between the milled and existing surfaces shall fall between 1 to 5 feet of any lane line.

If the transverse joint is tapered with a temporary asphalt ramp, the milled surface at the joint shall be constructed as a butt joint the full depth of the lift of asphalt to be placed on the milled surface. The Contractor shall be responsible for maintaining this asphalt ramp until all corresponding HMA is placed. All work associated with this joint will not be paid for separately, but shall be included in the cost of planing.

If the transverse joint is tapered with a planing machine, a butt joint shall be cut into the taper the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing. All work associated with this joint will not be paid for separately, but shall be included in the cost of planing.

Other approved transverse joint tapers shall be maintained at the expense of the Contractor, and at a minimum shall incorporate a butt joint the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing.

Distressed or irregular areas identified in the planed surface by the Engineer shall be patched.

The roadway shall be left in a safe and usable condition at the end of each work day. The Contractor shall take appropriate measures to ensure that the milled surface does not trap or hold water. All required pavement markings removed by the planing shall be restored before the roadway is opened to traffic.

3
REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT (PLANING)

All milled surfaces to be overlaid with HMA shall be covered with new asphalt within 5 calendar days. All areas on this project that are not overlaid within the specified working days will be assessed a lane rental fee of \$2500 for C-470 and \$200 for Wadsworth Blvd. per occurrence for each day or fraction thereof and any required surface repairs shall be paid for by the Contractor.

All planing shall be completed full width and parallel to the travel lanes before resurfacing commences unless otherwise directed by the Engineer.

All material generated by the planing operation shall become the property of the Contractor unless otherwise noted in the Contract.

Add subsection 202.091 immediately following subsection 202.09 as follows:

202.091 Equipment

Each planer shall conform to the following:

The planer shall have sufficient power, traction and stability to maintain an accurate depth of cut. The propulsion and guidance system of the planer shall be maintained in such condition that the planer may be operated to straight and true lines.

The planer shall be capable of operating with automatic grade controls (contact or non-contact) on both sides of the machine using a 30 foot averaging system or other approved grade control systems. The use of such controls shall be described in the Contractor's QCP.

The planer shall be capable of picking up the removed material in a single operation. A self loading conveyor shall be an integral part of the planer. Windrows will not be allowed.

Subsection 202.12 shall include the following:

Macrotexture testing, macrotexture corrective actions, planers, brooms and all other work necessary to complete the item will not be measured and paid for separately, but shall be included in the work.

**Colorado Procedure 77
Standard Procedure for**

**DETERMINATION OF MACROTEXTURE OF PLANED
HOT MIX ASPHALT PAVEMENT**

1.0 SCOPE.

1.1 This test method describes the means to evaluate the macrotexture of a planed pavement surface.

1.2 This CP may involve hazardous materials, operations, and equipment. This CP does not purport to address all of the safety problems associated with the CP's use. The CP user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 REFERENCE.

2.1 AASHTO Standards.

M 247-02, Type I Glass Beads Used In Traffic Paints

2.2 ASTM Standards.

E 1094-04 Pharmaceutical Glass Graduates or ISO Standard 6706 Plastic Laboratory Ware - Graduated Measuring Cylinders

2.3 CP Standards.

Appendix L Random Sampling

3.0 TERMINOLOGY. Terms and abbreviations shall be in accordance with the Department's Standard Specifications, and Field Materials Manual.

4.0 SIGNIFICANCE AND USE. This CP is used to evaluate the macrotexture of a milled pavement surface.

5.0 APPARATUS.

5.1 Filler: Type 1 glass beads in accordance with AASHTO M 247-02.

5.2 Spreader: A flat, stiff hard disk made from methyl methacrylate (Plexiglas) with a thickness of 0.5 ± 0.1 in., diameter of 8 ± 2 in. and a round handle affixed in the center used to spread the filler.

5.3 A conical or cylindrical shape graduate, Type 1, Class B or better, 250 ml capacity conforming to the volume and accuracy requirements of ASTM E 1094-04 or ISO Standard 6706 used to measure the volume of filler for the test.

5.4 Brushes: A stiff wire brush and a soft bristle brush used to clean the pavement.

5.5 Container: A small container with a secure and easily removable cover used to store 200 ml of filler.

5.6 Screen: A shield used to protect the test area from air turbulence created from wind or traffic.

6.0 LABORATORY PREPARATION.

6.1 Prepare one container for each sample location.

6.2 Fill the graduate with 200 ± 2 ml of filler.

6.3 Gently tap the side of the graduate to level the surface of the filler.

6.4 Place the measured volume of filler in the container.

6.5 Label the container with type and quantity of filler.

7.0 PROCEDURE.

7.1 Randomly determine a sample location on the milled pavement surface in accordance with Appendix L, to test the macrotexture.

7.2 Inspect the sample location and ensure it is a dry, homogeneous site, free of unique or localized features such as cracks, joints, stripping and patching.

7.3 If localized features are present, move up-station at the same transverse offset until a suitable site is found.

7.4 Gently clean an area of about 1 foot by 1 foot for the sample location using the stiff wire brush to remove any, residue, debris or loosely bonded material. Be careful not to dislodge bonded material. After using the stiff wire brush, gently brush the sample location with the soft bristle brush to remove any remaining debris.

7.5 Place the screen on the milled pavement surface to protect the sample location from air turbulence.

7.6 Hold the container with filler above the pavement at the sample location at a height not greater than 4in.

7.7 Pour the measured volume of filler from the container onto the milled pavement surface into a conical pile.

7.8 Place the spreader lightly on top of the conical pile of filler being careful not to compact the filler.

7.9 Move the spreader in a slow, circular motion to disperse the filler in a circular area and to create a defined crest around the perimeter.

7.10 Continue spreading the filler until it is well dispersed and the spreader rides on top of the high points of the milled pavement surface.

7.11 Measure and record the diameter of the circular area four times, at intervals of 45° and to the nearest 0.1 in., as shown below.

7.12 Measure the diameter of the circular area from the top (crest) of the slope on one side, through the center, and to the top (crest) of the slope on the other side of the circular area.

7.13 Calculate the average diameter of the circular area covered by the filler.

7.14 Determine the macrotexture thickness of the milled pavement surface by using the cross reference table on the bottom of the Macro-Texture Report form. Report the result to three decimal places.

7.15 Remove the filler material from the location using the soft bristle brush and repeat steps 7.5 through 7.14.

7.16 Determine the average macrotexture thickness by adding the two results determined in the previous step 7.14 and dividing by 2. Report the result to three decimal places.

8.0 CALCULATIONS. Calculate the average diameter of the circular area covered by the filler.

$$Da = (D1 + D2 + D3 + D4) / 4$$

Where:

Da = Average diameter of the filler area, in

D1, D2, D3, D4 = Diameters of the filler area, in

Macrotexture Thickness:

1 in. = 2.54 cm; 1 in.³ = 16.387 cm³ (cc) (ml)

Thus: 200 ml → ((200 ml)/(16.387 ml/in.³)) = 12.20 in.³

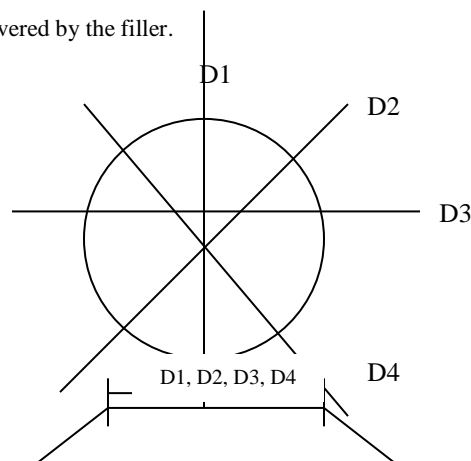
Thickness: Volume/Area

Example:

Da = 8 in.

Area = $\pi r^2 \rightarrow \pi (8/2)^2 = 50.265 \text{ in.}^2$

Thickness = 12.20 in.³/50.265 in.² = 0.243 in.



9.0 REPORT. Report the following information.

Date of test _____ Name of prime contractor and representative _____
Project number _____ Diameter of filler area, D1, D2, D3, D4 _____
Sub-Account Number _____ Average diameter of filler area, in _____
Station or Milepost of sample location _____ Macrotexture Thickness _____
Offset of sample location _____ Name of milling contractor and representative _____

MACRO-TEXTURE REPORT

Project No: _____ Sub-Account No: _____

Milling Contractor: _____ Prime Contractor: _____

Milling Rep.: _____ Prime Rep.: _____

Test #	Date	Sta	Offset	Dia. D1 (in)	Dia. D2 (in)	Dia. D3 (in)	Dia. D4 (in)	Dia. Avg (in)	Macro Texture
Average =									

Average =									

Average =									

Average =									

MACROTEXTURE THICKNESS BASED ON 200 ML OF FILLER AND AVERAGE DIAMETER

Average Diameter (inches)	Macrotexture Thickness (inches)	Average Diameter (inches)	Macrotexture Thickness (inches)	Average Diameter (inches)	Macrotexture Thickness (inches)
7.1	0.308	8.8	0.201	10.5	0.141
7.2	0.300	8.9	0.196	10.6	0.138
7.3	0.292	9.0	0.192	10.7	0.136
7.4	0.284	9.1	0.188	10.8	0.133
7.5	0.276	9.2	0.184	10.9	0.131
7.6	0.269	9.3	0.180	11.0	0.128
7.7	0.262	9.4	0.176	11.1	0.126
7.8	0.255	9.5	0.172	11.2	0.124
7.9	0.249	9.6	0.169	11.3	0.122
8.0	0.243	9.7	0.165	11.4	0.120
8.1	0.237	9.8	0.162	11.5	0.117
8.2	0.231	9.9	0.159	11.6	0.115
8.3	0.226	10.0	0.155	11.7	0.113
8.4	0.220	10.1	0.152	11.8	0.112
8.5	0.215	10.2	0.149	11.9	0.110
8.6	0.210	10.3	0.146	12.0	0.108
8.7	0.205	10.4	0.144	12.1	0.106

**REVISION OF SECTION 202
CLEAN CULVERT (Special)**

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work consists of cleaning, maintaining, removing and disposing of sediment and other debris in the storm drain inlets and culverts at locations shown on the plans.

Subsection 202.02 shall include the following:

Prior to beginning any work other than traffic control, debris in all existing inlets, culverts, and storm drains, within project limits, dirt shall be dislodged and removed to the greatest extent possible. Cleaning shall be paid for as 202 Clean Culvert (Special), Each. Cleaning shall be done by Vactor removal methods. The contractor shall document how much sediment is removed and provide the volume quantity to the Engineer. The contractor shall remove and fully re-secure all grates per CDOT Standards. The Contractor shall treat the bolts with anti-seize compound prior to re-installation. All work, including drilling out of broken bolts, re-tapping bolt holes, replacement bolts, anti-seize treatment, and providing missing bolts, necessary to re-secure the grates shall be included in the cost of the work. If construction - related sediment or debris has accumulated in the inlet or culvert after initial cleaning and during construction, the Contractor shall clean, remove and dispose of the sediment and debris at the Contractor's expense. In case of work suspension longer in duration than one month, due to unsuitable weather, the Contractor shall re-clean the storm drain inlets and culverts as directed by the Engineer.

Subsection 202.11 shall include the following:

Clean Culvert (Special) will be measured by the actual number of units of existing inlets to be cleaned within the project limits.

Subsection 202.12 shall include the following:

<i>Pay Item</i>	<i>Pay Unit</i>
Clean Culvert (Special)	Each

Payment will be full compensation for all work, materials and equipment required to clean, maintain, remove and dispose of sediment and other debris from the storm drain inlets and culverts prior to construction.

**REVISION OF SECTION 203
SWEEPING (WITH PICKUP BROOM)**

Section 203 of the Standard Specifications is hereby revised for this project as follows:

Subsection 203.01 shall include the following:

This work includes removal and disposal of debris on the highway beyond that generated by the Contractor's own construction activities. Debris generated by the Contractor's own construction activities shall be picked up at the Contractor's expense in accordance with subsection 208.04 of the Standard Special Provisions and Revision of Sections 101, 107, & 208 – Water Quality Control. Debris on the highway requiring removal and disposal and that was caused by circumstances beyond the Contractor's control will be paid for under this revision.

Subsection 203.02 shall include the following:

Street-sweeping trucks shall be transported to the work site if they are not capable of highway speeds. The trucks shall utilize a broom sweeper and be water-filled for dust suppression. The vehicle must be equipped with safety lights. All vehicles are subject to the approval of the Engineer.

Subsection 203.13 shall include the following:

The quantity measured for sweeping will be the number of hours that each sweep truck is actually used. Hours for equipment that is inoperative due to breakdown will not be paid for. Time involved in moving onto or off the project site will not be measured and paid for. Water used as dust suppression will be incidental to the pay item.

Subsection 203.14 shall include the following:

Payment will be made under Sweeping (with Pickup Broom):

Pay Item	Pay Unit
Sweeping (With Pickup Broom)	Hour

**REVISION OF SECTION 207
TOPSOIL**

Section 207 of the Standard Specification is hereby revised for this project as follows:

Subsection 207.01 shall include the following:

This work includes imported topsoil that is to be placed in the disturbed area within the project limits.

Subsection 207.02 shall include the following:

The source of topsoil for this project is undesignated. This imported topsoil is subject to approval by the Engineer before use. The Contractor shall submit a 1 pound sample of the product 4 weeks before its use on the project site for the Engineer's approval. A Certificate of Compliance shall be provided to the Engineer to verify the organic matter content, pH, and ratio of carbon matter to nitrogen. Soil tests shall be the method of Soil Analysis used at the Colorado State University Soil Testing Laboratory.

The topsoil shall have an acidic reaction of 6.0 to 7.5 pH and shall contain between 1 and 4 percent well-composted organic matter. Any organic amendments shall include the following:

An organic product containing a mixture of well rotted/composted cow or sheep manure and/or composted aspen humus or wood residue or approved equal (sphagnum or native mountain peat is not acceptable). Organic product that has been aerobically and naturally processed in such a manner as to maintain a consistent temperature of 140 degrees Fahrenheit or greater for a period of time long enough to accomplish the following specifications:

1. The windrows of composted organic amendment (cow or sheep manure) must have been composted for 70 to 90 days. Certification must be provided to the Engineer to prove the product has gone through this process.
2. Harmful pathogens including coliform bacteria must have been eradicated.
3. The product must be free from noxious weeds or their seeds or any plant, root or seeds that would be toxic or harmful to growth.
4. The carbon-to-nitrogen ratio must be between 15/1 to 25/1.
5. The product must not contain solid particles greater than ½" in diameter.
6. The product shall have a non-offensive smell similar to fresh, turned soil.
7. The product must be free from dirt and soil, and contain a maximum of 30% composted pine or aspen wood residue. Saw dust is unacceptable.
8. The pH after composting shall be between 5.0 and 7.5, with an organic-matter content of not less than 30%.

Soluble salts shall not be greater than 3mm hos/cm.

2
REVISION OF SECTION 207
TOPSOIL

Topsoil shall contain the following minimum ammonium DTPA (chelate) extractable nutrients (this is the extracting solution used by CSU Soil Testing Laboratory).

Nitrogen	5 ppm (air-dried)
Phosphorus	5 ppm
Potassium	30 ppm
Iron	5 ppm

Topsoil shall not include any minerals or elements detrimental to plant growth.

Delete Subsection 207.04 and replace it with the following:

Topsoil will be measured in place.

Subsection 207.05 shall include the following:

The addition of manure or soil amendments needed to bring the topsoil into conformance with the specifications will not be measured and paid for separately, but shall be included in the work. Stockpile topsoil activities shall be included in the price of the work. Soil Analysis shall not be paid for separately, but shall be included in the cost of the work.

<u>Pay Item</u>	<u>Pay Unit</u>
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F/A Erosion Control	F/A
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SECTION 240
PROTECTION OF MIGRATORY BIRDS
BIOLOGICAL WORK PERFORMED BY THE CONTRACTOR'S BIOLOGIST

Section 240 is hereby added to the Project Special Provisions for this project as follows:

DESCRIPTION

240.01 This work consists of protecting migratory birds during construction work on structures.

MATERIALS AND CONSTRUCTION REQUIREMENTS

240.02 The Contractor shall schedule construction activity, including clearing and grubbing operations and work on structures, to avoid taking (pursue, hunt, take, capture, or kill; attempt to take, capture, kill or possess) migratory birds or their nests protected by the Migratory Bird Treaty Act (MBTA). If construction activity is to occur between April 1 and August 31, then the following specifications must be followed and the Contractor shall retain a qualified wildlife biologist to determine where nest removal may occur or will be required during construction. The wildlife biologist shall have a minimum of three years' experience conducting migratory bird surveys and implementing the requirements of the MBTA. The Contractor shall submit documentation of the biologists' education and experience to the Engineer for acceptance. A biologist with less experience may be used by the Contractor subject to the approval of the Engineer based on review of the biologist's qualifications. If all construction activities occur after August 31 and before April 1, then the requirements set forth in this specification are not required.

The wildlife biologist shall record the location of each protected nest, bird species, the protection method used, and the date installed. A copy of these records will be submitted to the Engineer.

(A) *Vegetation Removal.* When possible, vegetation shall be cleared prior to the time when active nests are present. Vegetation removal activities shall be timed to avoid the migratory bird breeding season which begins on April 1 and runs to August 31. All areas scheduled for clearing and grubbing between April 1 and August 31 shall first be surveyed by the wildlife biologist within 50 feet of the work limits for active migratory bird nests. Contractor personnel shall enter areas outside CDOT right-of-way only if a written, signed document granting permission to enter the property has been obtained from the property owner. The Contractor shall document all denials of permission to enter property. The Contractor shall avoid all migratory bird nests. The Contractor shall avoid the area within 50 feet of the active nests or the area within the distance recommended by the biologist until all nests within that area have become inactive. Inactive nest removal and other necessary measures shall be incorporated into the work as follows.

1. *Tree and Shrub Removal or Trimming.* Tree and shrub removal or trimming shall occur before April 1 or after August 31 if possible. If tree and shrub removal or trimming will occur between April 1 and August 31, a survey for active nests shall be conducted by the wildlife biologist within the seven days immediately prior to the beginning of work in each area of tree and shrub removal or trimming. The survey shall be conducted for each phase of any tree or shrub removal or trimming.

If an active nest containing eggs or young birds is found, the tree or shrub containing the active nest shall remain undisturbed and protected until the nest becomes inactive. The nest shall be protected by placing fence (plastic) a minimum distance of 50 feet from each nest to be undisturbed. This buffer dimension may be changed if determined appropriate by the wildlife biologist and approved by the Engineer. Work shall not proceed within the fenced buffer area until the young have fledged or the nests have become inactive. If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is satisfactorily repaired at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

2

SECTION 240

PROTECTION OF MIGRATORY BIRDS

BIOLOGICAL WORK PERFORMED BY THE CONTRACTOR'S BIOLOGIST

2. *Grasses and Other Vegetation Management.* Due to the potential for encountering ground nesting birds' habitat, if work occurs between April 1 and August 31, the area shall be surveyed by a wildlife biologist within the seven days immediately prior to ground disturbing activities.

The undisturbed ground cover to 50 feet beyond the planned disturbance, or to the right-of-way line, whichever is less, shall be maintained at a height of 6 inches or less beginning April 1 and continuing until August 31 or until the end of ground disturbance work, whichever comes first.

If birds establish a nest within the survey area, an appropriate buffer of 50 feet will be established around the nest by the wildlife biologist. This buffer dimension may be changed if determined appropriate by the wildlife biologist and approved by the Engineer. The Contractor shall install fence (plastic) at the perimeter of the buffer. Work shall not proceed within the buffer until the young have fledged or the nests have become inactive.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is satisfactorily repaired at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

(B) *Work on Structures.* The Contractor shall conduct work on structures in a manner that does not result in a taking of migratory birds protected by the Migratory Bird Treaty Act (MBTA). The Contractor shall not conduct the work on structures during the primary birding season, April 1 through August 31, unless the Contractor takes the following actions:

1. The Contractor shall remove existing nests prior to April 1. If the Contract is not awarded prior to April 1 and CDOT has removed existing nests, then the monitoring of nest building shall become the Contractor's responsibility upon Notice to Proceed.
2. During the time that the birds are trying to build or occupy their nests, between April 1 and August 31, the Contractor shall monitor the structures at least once every three days for any nesting activity.
3. If the birds have started to build any nests, the nests shall be removed before they are completed. Water shall not be used to remove the nests if nests are located within 50 feet of any surface waters.
4. Installation of netting may be used to prevent nest building. The netting shall be monitored and repaired or replaced as needed. Netting shall consist of a mesh with openings that are $\frac{3}{4}$ inch by $\frac{3}{4}$ inch or less.

If an active nest becomes established, i.e., there are eggs or young in the nest, all work that could result in abandonment or destruction of the nest shall be avoided until the young have fledged or the nest is unoccupied as determined by the CDOT biologist and approved by the Engineer. The Contractor shall prevent construction activity from displacing birds after they have laid their eggs and before the young have fledged. If the project continues into the following spring, this cycle shall be repeated. When work on the structure is complete, the Contractor shall remove and properly dispose of netting used on the structure. The taking of a migratory bird shall be reported to the Engineer. The Contractor shall be responsible for all penalties levied by the U. S. Fish and Wildlife Service (USFWS) for the taking of a migratory bird.

3
SECTION 240
PROTECTION OF MIGRATORY BIRDS
BIOLOGICAL WORK PERFORMED BY THE CONTRACTOR'S BIOLOGIST

METHOD OF MEASUREMENT

240.03 Wildlife Biologist will be full compensation for all work and materials required to complete the item, including wildlife biologist, wildlife survey, and documentation (record of nest location and protection method).

Clearing and grubbing will be measured and paid for in accordance with Section 201. Mowing will not be measured and paid for separately, but shall be included in the work. Removal and trimming of trees will be measured and paid for in accordance with Section 202.

Fence needed to protect migratory birds and nests will be measured and paid for in accordance with Section 607.

BASIS OF PAYMENT

240.04 The accepted quantities measured as provided above will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

<u>Pay Item</u>	<u>Pay Unit</u>
Wildlife Biologist	Hour
Removal of Nests	Hour

**REVISION OF SECTION 304
AGGREGATE BASE COURSE**

Section 304 of the Standard Specifications is hereby revised for this project as follows:

Subsection 304.02 shall include the following:

Materials for the base course shall be Aggregate Base Course (Class 6) as shown in subsection 703.03.

The aggregate base course (Class 6) must meet the gradation requirements and have a resistance value of at least 78 when tested by the Hveem Stabilometer method.

Subsection 304.08 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Aggregate Base Course (Class 6)	Ton

Compaction, water, impervious membrane, excavation, and removal of unsuitable material and all other work necessary to complete this item will not be measured and paid for separately but shall be included as part of the work.

1
REVISION OF SECTIONS 401 AND 703
STONE MATRIX ASPHALT PAVEMENT

Sections 401 and 703 of the Standard Specifications are hereby revised for this project as follows:

Subsection 401.02 shall include the following:

Recycled Asphalt Pavement (RAP) shall not be used in Stone Matrix Asphalt (SMA) mix.

Subsection 401.09 shall include the following:

Each SMA load shall be completely covered and securely fastened with a full tarp.

Subsection 401.16 shall include the following:

The SMA mixture shall be transported and placed on the roadway without drain-down or flushing. All flushed areas behind the paver shall be removed immediately upon discovery. If more than 50 square feet of flushed SMA pavement is ordered removed and replaced in any continuous 500 linear feet of paver width laydown, operations shall be discontinued until the source of the flushing has been found and corrected. The Engineer will designate the depth and area of all flushed areas requiring removal and replacement. All costs associated with the removal and replacement of the flushed areas shall be at the Contractor's expense.

Subsection 401.17 shall include the following:

Rollers shall not be used in a vibratory mode on SMA unless they are first used successfully in the demonstration control strip specified in subsection 403.03. Pneumatic wheel rollers shall not be used on SMA mix.

Stone Matrix Asphalt Pavement shall be placed and compacted in accordance with the temperatures listed in subsection 401.07 as revised for this project.

The relative compaction for all SMA mixtures will be measured from roadway cores in accordance with CP 44, Method B, unless the SMA mixture is being placed on a structure (bridge deck) in which case the Engineer may specify that nuclear gauge measurements be used.

When cores are used, the Contractor shall provide all labor and equipment for the coring operation and filling the core holes. When nuclear density gauges are used, the tests will be performed in accordance with CP 81 and CP 82.

In-place density for SMA shall be 93 to 97 percent of the SMA mix maximum specific gravity as measured according to CP 51.

Subsection 401.22 shall include the following:

Acceptance, testing, and pay factors for SMA shall be in accordance with subsections 105.05 and 106.05 as revised for this project for Hot Mix Asphalt. The Specifications for gradation acceptance shall be applied for all SMA placed on the project.

2
REVISION OF SECTIONS 401 AND 703
STONE MATRIX ASPHALT PAVEMENT

Subsection 703.06 shall include the following:

Mineral filler for the Stone Matrix Asphalt pavement shall be limestone dust and shall meet the requirements of this subsection and the following:

Plasticity Index (AASHTO T90) 4% Maximum

The Contractor shall submit hydrometer analysis (AASHTO T88) for the mineral filler used in the SMA mix.

**REVISION OF SECTION 401
HOT MIX ASPHALT COMPACTION
(STEEL WHEEL ROLLER)**

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, first paragraph, delete the second sentence and replace with the following:

Steel wheel rollers will be required on this project. Steel wheel rollers shall not be used in vibratory mode on bridge decks.

REVISION OF SECTION 403 HOT MIX ASPHALT

Section 403 of the Standard Specifications is hereby revised for this project as follows:

Subsection 403.02 shall include the following:

The design mix for hot mix asphalt shall conform to the following:

TABLE 403-1

Property	Test Method	Value For Grading			
				SX (100)	Patching
Air Voids, percent at: N (initial) [for information only] N (design)	CPL 5115			3.5 – 4.5	3.5 – 4.5
Lab Compaction (Revolutions): N (initial) [for information only] N (design)	CPL 5115			8 100	8 100
Stability, minimum	CPL 5106			30	30
Aggregate Retained on the 4.75 mm (No. 4) Sieve with at least 2 Mechanically Induced fractured faces, % minimum	CP 45			60	60
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B			80	80
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B			205 (30)	205 (30)
Grade of Asphalt Cement, Top Layer				PG 76-28	PG 76-28
Grade of Asphalt Cement, Layers below Top				PG 76-28	PG 76-28
Voids in the Mineral Aggregate (VMA) % minimum	CP 48			See Table 403-2	See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2			65-75	65-75
Dust to Asphalt Ratio Fine Gradation Coarse Gradation	CP 50			0.6 – 1.2 0.8 – 1.6	0.6 – 1.2 0.8 – 1.6
<p>Note: AI MS-2 = Asphalt Institute Manual Series 2</p> <p>Note: The current version of CPL 5115 is available from the Region Materials Engineer.</p> <p>Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems.</p> <p>Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen. Gradations for mixes with a nominal maximum aggregate size of ¾ inch or smaller are considered a coarse gradation if they pass below the maximum density line at the #8 screen.</p>					

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum.

-2-
**REVISION OF SECTION 403
HOT MIX ASPHALT**

TABLE 403-2

Minimum Voids in the Mineral Aggregate (VMA)			
Nominal Maximum Size*, mm (inches)	***Design Air Voids **		
	3.5%	4.0%	4.5%
37.5 (1½)	11.6	11.7	11.8
25.0 (1)	12.6	12.7	12.8
19.0 (¾)	13.6	13.7	13.8
12.5 (½)	14.6	14.7	14.8
9.5 (⅜)	15.6	15.7	15.8
<p>* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%.</p> <p>** Interpolate specified VMA values for design air voids between those listed.</p> <p>*** Extrapolate specified VMA values for production air voids beyond those listed.</p>			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved prior to beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

Unless otherwise specified, hot mix asphalt for patching shall conform to the gradation requirements for Hot Mix Asphalt (Grading SX) (100) (PG 76-28).

A minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all hot mix asphalt.

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REVISION OF SECTION 403
HOT MIX ASPHALT

Subsection 403.03 shall include the following:

If liquid anti-stripping additive is added at the plant, an approved in-line blender must be used. The blender shall be in the line from the storage tank to the drier drum or pugmill. The blender shall apply sufficient mixing action to thoroughly mix the asphalt cement and anti-stripping additive.

The Contractor shall construct the work such that all roadway pavement placed prior to the time paving operations end for the year, shall be completed to the full thickness required by the plans. The Contractor's Progress Schedule shall show the methods to be used to comply with this requirement.

Delete subsection 403.05 and replace with the following:

403.05 The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton for the bituminous mixture.

Payment will be made under:

Pay Item	Pay Unit
Hot Mix Asphalt (Grading SX)(100)(PG 76-28)	Ton
Hot Mix Asphalt (Patching) (Asphalt)	Ton

Aggregate, asphalt recycling agent, additives, hydrated lime, and all other work necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid. When the pay item includes the PG binder grade, the asphalt cement will not be measured and paid for separately, but shall be included in the work. When the pay item does not include the PG binder grade, asphalt cement will be measured and paid for in accordance with Section 411. Asphalt cement used in Hot Mix Asphalt (Patching) will not be measured and paid for separately, but shall be included in the work.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately, but shall be included in the work.

**REVISION OF SECTION 403
STONE MATRIX ASPHALT PAVEMENT**

Section 403 of the Standard Specifications is hereby revised for this project as follows:

Subsection 403.01 shall include the following:

This work includes placing a Stone Matrix Asphalt (SMA) pavement as shown on the plans.

Subsection 403.02 shall include the following:

The SMA gradation for this project shall be ½ inch.

Mixture design and field control testing of SMA shall be performed using either the SuperPave (CPL 5115, 100 Gyration) or the Marshall Method (AASHTO T245, 50 Blow).

A minimum of two weeks prior to the proposed use of any Stone Matrix Asphalt pavement on the project, a pre-paving conference will be conducted. At that time, the Contractor shall submit to the Engineer, a mix design meeting the appropriate specification requirements for one of the following:

The SuperPave SMA mix design shall conform to the requirements of Table 403-1a:

Table 403-1a

Property	Test Method	Value for SMA
Air Voids, percent at: N(Design)	CPL 5115	3.0 – 4.0
Lab compaction (Revolutions) N(Design)	CPL 5115	100
Accelerated Moisture Susceptibility, tensile strength Ratio, (Lottman), minimum	CPL 5109, Method B	70
Minimum Dry Split Tensile Strength, psi	CPL 5109, Method B	30
Grade of Asphalt Cement		PG 76-28
Voids in the Mineral Aggregate (VMA) %, minimum	CP 48	17
Draindown at Production Temperature	AASHTO T305	0.3 maximum
% VCA ¹ _{MIX}	AASHTO R 46	Less than VCA _{DRC} ²
Note: The current version of CPL 5115 is available from the Region Materials Engineer		
Note: Copies of AASHTO R 46 and M 325 can be obtained from the Region Materials Engineer		
Note: ¹ Voids in the Coarse Aggregate		
Note: ² Dry-rodged condition		

Form 43 will establish construction targets for asphalt cement and all mix properties at air voids up to 1.0 percent below the mix design optimum.

2
REVISION OF SECTION 403
STONE MATRIX ASPHALT PAVEMENT

~~The Marshall SMA mix design shall conform to the following:~~

Mix Properties	Value
Stability, Marshall Compactor	1400 lbs., min
% Voids in Total Mix	3 – 4%
VMA (% Voids in the Mineral Aggregate)	17 min.
Lottman, CPL 5109, Method B	70% min
Dry Tensile Strength, (CPL 5109)	30 psi, min.

Regardless of mix design method, a minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all Stone Matrix Asphalt.

The SMA Mix design must be approved by the Engineer before any pavement is placed on the project. In addition, the Contractor shall provide field control testing during production of the SMA mix and for the demonstration control strip. The Contractor shall perform the following tests and provide the results to the Engineer during production:

If a SuperPave SMA mix design is used, the Contractor shall perform the following tests and provide the results to the Engineer during production:

Superpave Mix Property	Frequency
Draindown (AASHTO T 305)	1/1000 tons or fraction thereof
Percent Voids in the total mix @ $N_{(design)}$	1/1000 tons or fraction thereof
VMA (Percent Voids in the Mineral Aggregate) @ $N_{(design)}$	1/1000 tons or fraction thereof
Lottman, CPL 5109, Method B	1/5000 tons or fraction thereof
Dry Tensile Strength, CPL 5109	1/5000 tons or fraction thereof
Percent AC & Aggregate Gradation CP 5120	1/1000 tons or fraction thereof

If a Marshall SMA mix design is used, the Contractor shall perform the following tests and provide the results to the Engineer during production:

Marshall Mix Property	Frequency
Draindown (AASHTO T 305)	1/1000 tons or fraction thereof
Stability (Marshall)	1/1000 tons or fraction thereof
Percent Voids in the total mix	1/1000 tons or fraction thereof
VMA (Percent Voids in the Mineral Aggregate)	1/1000 tons or fraction thereof
Lottman, CPL 5109, Method B	1/5000 tons or fraction thereof
Dry Tensile Strength, CPL 5109	1/5000 tons or fraction thereof
Percent AC & Aggregate Gradation CP 5120	1/1000 tons or fraction thereof

3
REVISION OF SECTION 403
STONE MATRIX ASPHALT PAVEMENT

Subsection 403.03 shall include the following:

The mineral filler for SMA shall be stored in a separate silo and added automatically in the correct proportion. The mineral filler addition equipment shall be electronically or mechanically interlocked to the aggregate feed sensors so that the proper amount of mineral filler is added whenever SMA is produced.

The SMA mineral filler shall be added at the same point the asphalt cement is added to the aggregate.

Tack coat between the existing pavement and Stone Matrix Asphalt pavement shall be placed at a rate between 0.03 and 0.05 gallons per square yard.

Before proceeding with SMA placement, the Contractor shall demonstrate the ability to produce and place a satisfactory mix in a Demonstration Control Strip (DCS). The Contractor will coordinate with the Engineer on the proposed location of the DCS. The DCS shall consist of a minimum quantity of 500 tons placed in one lane, full width. Within the last 200 tons of SMA placed in the DCS, the Contractor and CDOT shall determine properties (VMA, Voids, in-place density, AC content, gradation, and Marshall Stability, if required) of the project produced SMA mix used in the DCS and provide the results to the Engineer. The Contractor may proceed with full production if all mixture properties are within the specified tolerances.

To determine the in-place density and roller pattern, one core shall be taken at three random locations within the last 200 tons of the DCS. The Engineer will determine the coring locations using a stratified random sampling process. The cores shall be immediately submitted to the Engineer and will be used for determining acceptance of the DCS. Densities of the random samples will be determined by cores according to CP 44. Coring shall be performed by the contractor under CDOT observation. Coring will not be measured and paid for separately but shall be included in the work.

The DCS will be designated as a separate process. Payment for the DCS will be made in accordance with Subsection 105.05, Conformity to the Contract of Hot Mix Asphalt.

Subsection 403.04 shall include the following:

Stone Matrix Asphalt will be measured by the actual number of tons that are completed and accepted.

Subsection 403.05 shall include the following:

Pay Item	Pay Unit
Stone Matrix Asphalt (Fibers)(Asphalt)	Ton

Mix design, furnishing, hauling, preparing, and placing all materials, including aggregates, asphalt cement, limestone dust, hydrated lime, tack coat, and approved demonstration control strip; labor, equipment tools, setting of lines and guides where specified, and all other work necessary to complete the item will not be paid for separately but shall be included in the work.

**REVISION OF SECTION 613
ELECTRICAL CONDUIT**

Section 613 of the Standard Specifications is hereby revised for this project as follows:

Subsection 613.01 shall include the following:

This work includes furnishing and installing either HDPE or PVC electrical conduit. All materials furnished, assembled, fabricate and installed under this item shall be new, corrosion resistant and in strict accordance with the plan sheets and these Special Provisions.

Subsection 613.07 shall include the following:

All conduit shall be Schedule 80 in the diameters, quantities and colors as shown on the project detail sheet and shall be compliant with all ASTM and Bellcore TW-NWT-000356 requirements.

All HDPE conduit shall be factory lubricated, low friction, high-density conduit constructed of virgin high-density polyethylene resin. Conduit shall be capable of being coiled on reels in continuous lengths, transported, stored outdoors, and subsequently uncoiled for installation, without affecting its properties or performance.

All conduit shall be certified by the manufacturer as meeting ANSI/UL 6, 651, or 651A. The manufacturer shall be ISO 9000 compliant.

Electrical Conduit (Bored) shall be HDPE and installed using a trenchless technology of directional boring.

Electrical Conduit (Plastic) shall be PVC or HDPE and installed by direct burial methods such as plowing, open trenching, or other excavation methods.

Each individual conduit shall be equipped with a pull tape as described below. Each bore/trench shall have a copper tracer wire of at least 12 gauge in one of the conduits. In trenches containing multiple conduits, the tracer wire shall not be installed in the same conduit as the fiber.

Each individual conduit shall be equipped with pull tape. The pull tape shall have a minimum tensile strength of 1800 lbs. and be of a design and manufacture that prevents cutting or burning into the conduit during cable installation.

The installation of conduit shall be performed in such a manner as to avoid unnecessary damage to streets, sidewalks, utilities, landscaping, and sprinkler systems. Excavations and conduit installation shall be performed in a continuous operation. All trenches shall be backfilled by the end of a shift. The material from trenching operations shall be placed in a location that will not cause damage or obstruction to vehicular or pedestrian traffic or interfere with surface drainage.

The Contractor shall take all necessary precautions to avoid heaving any existing asphalt/concrete mat or over-excavating a trench, whether caused by equipment directly or by dislodging rocks and boulders. Any such heaving or over-excavation shall be repaired or replaced at the Contractor's expense. The Contractor shall bear the cost of backfilling all over-excavated areas with the appropriate backfill material as approved by the project engineer.

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REVISION OF SECTION 613
ELECTRICAL CONDUIT

Conduit plugs shall be supplied and installed in all conduit ends as soon as the conduit is installed. Conduit shall be plugged at all termination points such as pull boxes, manholes, controller cabinets, and node buildings. All plugs shall be correctly sized to fit the conduit being plugged. Empty conduits shall be sealed with removable mechanical type duct plugs that provide a watertight barrier and are equipped with a rope tie on the inside end for connection of the pull tape. No foam sealant will be allowed. All plugs and sealant shall be approved prior to construction.

The Contractor shall restore all surface materials to their preconstruction condition or better, including but not limited to pavement, sidewalks, sprinkler systems, landscaping, shrubs, sod, or native vegetation that is disturbed by the conduit installation operation. All repairs shall be included in the cost of the conduit. If the Contractor is unable to bore the conduit at the lengths shown on the plans from access point to access point, all splice couplings and associated work to splice conduit shall be included in the cost of this item. The coupling technology shall allow the conduit to be connected without the need for special tools, and shall form a watertight, airtight seal. Breaking force between segments shall exceed 250 pounds of force. No metal fittings shall be allowed. No elevation difference between the conduit run and the splice location will be allowed. Conduit splices shall be kept to a minimum and all locations shall be approved by the project engineer. Additional pull boxes shall not be substituted for splices.

All conduits shall use sweeps to elevate the buried conduits to the final grade within a pull box or manhole, as shown in the plans. The sweeps shall be terminated within the pull boxes and manholes to allow for easy installation and removal of the conduit plugs. The sweeps shall be set above the ground surface within the pull box at a height that does not interfere with the coiling of the fiber optic cable.

All conduit runs are intended for the future installation of fiber optic cable and shall have a limited number of bends. The sum of the individual conduit bends on a single conduit run between two pull boxes shall not exceed 270°. No individual bend shall be greater than 45°. All conduit bends shall have a minimum acceptable radius of 30 inches.

If new conduits are installed in existing pull boxes, manholes or cabinet bases the Contractor shall carefully excavate around the pull box or manhole and install the new conduit as shown in the plans. The Contractor shall not damage the existing pull box, manhole or their contents. If the existing pull box, lid, or the concrete collars are cracked or damaged during conduit installation, the Contractor shall restore the damaged section to preconstruction condition at no additional cost.

Subsection 613.11 shall include the following:

Electrical Conduit will be measured by the actual number of linear feet that are installed and accepted. Conduit shall also include anchors, bands, skids, sweeps, pull tape, copper tracer wire, adapters, fittings, conduit plugs, installation equipment, splice couplings, mounting brackets and hardware, structure anchors, adhesives, labor, and all other items necessary to complete the work.

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REVISION OF SECTION 613
ELECTRICAL CONDUIT

Subsection 613.12 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
2 Inch Electrical Conduit (Plastic)	Linear Foot

Electrical Conduit contract unit price shall be full compensation for work described above, specified in the plans, and complete and in place.

**REVISION OF SECTION 613
PULL BOXES - GENERAL**

Section 613 of the Standard Specifications is hereby revised for this project as follows:

Subsection 613.07 shall include the following:

Pull boxes, covers and extensions shall be made of fiberglass reinforced polymer concrete. Pull boxes shall be verified by a 3rd Party Nationally Recognized Independent Testing Laboratory as meeting all test provisions of the latest ANSI/SCTE 77 Specification for Underground Enclosure Integrity, Tier 22 rating. Identification indicating Tier 22 compliance shall be labeled or stenciled on the inside and outside of the box and the underside of the cover. Certification documents shall be submitted with material submittals. The pull box shall have a detachable cover with a skid-resistant surface and have the words "CDOT TRAFFIC" or, "CDOT COMM" cast into the surface. Painting the words shall not be accepted. The cover shall be attached to the pull box body by means of a minimum 3/8 - 7 Unified National Course (UNC) Stainless Steel penta head bolts and shall have two lift slots to aid in the removal of the lid. Lift slots shall be rated for a minimum pull out of 3,000 pounds.

Pull boxes installed in dirt or landscape areas shall have a 12 inch wide by 6 inch thick concrete collar placed around the top as shown on the Project Special Detail Sheet.

All concrete collars shall be Portland Cement Concrete Class B and shall be in accordance with Section 601.

Pull Box (Surface Mounted) shall be metal type with a hinged front door and have at least a NEMA 3R rating. The hinged door shall be provided with both a weather tight seal and a padlock hasp. Surface mounted pull boxes shall be of the dimensions shown in the plans, and shall be mounted on or embedded into hard surfaces such as bridge decks, concrete barriers, retaining walls, or buildings, as shown on the plans. Surface mounted pull boxes shall be attached using 3/8-inch epoxy anchors or other methods, as approved by the Engineer. Surface mounted pull boxes shall not be used for ground installations.

Subsection 613.11 shall include the following:

Pull Boxes will be measured by the actual number that are installed and accepted, and will include base, lid, fiber optic cable brackets, excavation, backfill, concrete collars, and crush stone. Pull Boxes will also include the removal and patching of pavement, sidewalks, curb and gutters and their replacement in kind to match existing grade.

Subsection 613.12 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Pull Box (13x24x18) Deep	Each

Concrete will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 614 MICROWAVE VEHICLE RADAR DETECTOR

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

This work shall consist of furnishing and installing microwave vehicle radar detectors in accordance with these Special Provisions at the locations shown on the Plans. Contractor shall order the Wavetronix SmartSensor HD, model number WX-SS-H125, configuration software, mounting hardware, and compatible Click! DIN rail mountable components

MATERIALS (Pole Mounted Within 40' of Traffic Control Cabinet)

The Microwave Vehicle Radar Detector (MVRD) shall include the radar detector unit, 20' standard combination power/data cable with connector, required length of un-terminated Belden 9330 or approved equal 4 pair separately shielded 22 AWG cable to reach from pole mounted communications cabinet to traffic control cabinet, data line surge suppressor, pole mount hardware, communications cabinet, and configuration software.

The radar detection unit shall be a non-intrusive device using frequency modulated continuous wave radar technology for the gathering of vehicle information including traffic volume, lane occupancy, individual and average speed, vehicle classification, and presence. It shall have auto configuration capabilities to simultaneously identify up to ten highway lanes with the ability to detect over center median barriers and accurately detect partially occluded vehicles. Weather shall not impact the radar detection of the unit. Wind or temperature change shall not cause the device's original field installation configuration to alter over time. The radar detection unit shall include the manufacturer's recommended power/communication cable. The radar detection unit shall meet the following minimum requirements:

- | | |
|--------------------------------|--|
| (1) Installation Type: | Side Fire or Forward Fire installation |
| (2) Detection Zones: | Up to 10 Lanes Simultaneously |
| (3) Detection Range: | 3 to 250 feet |
| (4) Detection Zone Resolution: | 1 foot |
| (5) Time Resolution: | 2.5 msec |
| (6) Elevation 3 dB Beamwidth: | 65° |
| (7) Azimuth 3 dB Beamwidth: | 7° |
| (8) Operating Frequency: | 24.0 to 24.25 GHz (K-Band) |
| (9) Communications: | RS-232 and RS-485 |
| (10) Power: | 8.0 Watts at 9 to 36 Volts DC |
| (11) Operating Temperature: | -40 to +165°F (Ambient) |
| (12) Humidity: | Up to 95% Relative |
| (13) Shock: | 10g 10ms Half Sine Wave |

The communications cabinet shall be non metallic Nema 4x enclosure or equivalent, measuring 8 x 6 x 4 inches (H x W x D), and have a securable hinged door with weather proof seal to prevent the ingress of wind and water. The communications cabinet shall include an internal backplane with DIN rail and mounting bracket assembly for attachment to supporting pole.

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**REVISION OF SECTION 614
MICROWAVE VEHICLE RADAR DETECTOR**

The DIN rail mountable components to be installed inside the communications cabinet shall include a WX-SC-403 Click 403 Bluetooth to Serial converter, and a WX-SC-200 Click 200 data line surge suppressor with hot swappable protected busses. The Data Line surge suppressor shall provide protection for RS-232, RS-485, and DC power to the radar detection unit. Wiring for the surge suppressor shall be by means of pluggable screw terminals and include unprotected as well as protected RS-232 and RS-485 communications connectors and shall have a minimum operating temperature range of -29 to 165°F up to 95 percent relative humidity.

MATERIALS (mounted inside 334 traffic control cabinet)

There shall be a 19" bent rack mount Din rail, a Din rail mountable WX-SC-206 Click 206 .05 Amp re-settable circuit breaker and switch, a DIN rail mountable WX-SC-201 Click 201 AC to DC power converter. The power supply shall accept input voltage from 100 to 240 VAC at 45 to 65 Hz and provide 24 VDC output at 1Amp. The power supply shall have a minimum operating temperature range of -29 to 165°F up to 95 percent relative humidity. The power supply shall provide for 100 percent power reserve for a minimum of 20 ms to protect against static voltage dips, transient failures of supply voltage, or continuous phase failures. There shall be a WX-SC-205 Click 205 AC lightening power line surge protector DIN rail mountable with hot swappable protected busses, and a WX-SC-200 Click 200 data line surge suppressor. The surge suppressor shall provide protection for RS-232, RS-485, and DC power. Wiring for the surge suppressor shall be by means of pluggable screw terminals and include protected and unprotected RS-232 and RS-485 communications connectors. The surge suppressor shall have a minimum operating temperature range of -29 to 165°F up to 95 percent relative humidity. The necessary number of input file-mountable WX-SC-174 Click! 174 four-channel and/or WX-SC-172 Click! 172 two-channel contact closure (loop emulator) modules with required RJ-11 patch cords shall be provided to emulate 1 primary and 1 secondary loop for each mainline lane.

CONSTRUCTION REQUIREMENTS

Two conduit access holes, not to exceed 1.5 inches shall be made on the bottom of the communications cabinet. One of these holes is to be used for the power/communications cable in from the sensor and the other for the power/communications cable out to the traffic control cabinet. The access holes shall be positioned at a location to ensure the proper, safe routing of wiring entering the cabinet. 3/4 inch Type 201 stainless steel strap used in conjunction with Type 201 stainless steel buckles shall be used to mount the communications cabinet to the structure so that the top of the cabinet is approx 5 feet above surrounding grade. The communications cabinet shall be oriented such that anyone working in the cabinet has direct line of sight with oncoming traffic. The Contractor shall be responsible for any necessary modifications or additions needed to mount the communications cabinet to the structure.

0.75 inch Type 201 stainless steel strap used in conjunction with Type 201 stainless steel buckles shall be used to mount the radar detection unit at a height and angle determined by roadway off-set and detection distance in accordance with manufacturer's recommendations and shall be properly grounded per the manufacturer's specifications.

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REVISION OF SECTION 614
MICROWAVE VEHICLE RADAR DETECTOR

The manufacturer's recommended power/communication cable shall run on the interior of the mounting structure from the radar detection unit to the communications cabinet. A hole not to exceed 1.5 inches shall be made 12 inches below the radar detection unit to allow passage of the power/communications cable into the structure. The

Contractor shall ensure strain relief and drip loops in the power/communication cable before the cable enters the structure in accordance with manufacture's recommendations. Two holes not to exceed 1.5 inches shall be made below the communications cabinet to allow the power/communications cables to pass from the interior of the structure to the interior of the communications cabinet. Flexible conduit shall be used to run cables from the structure to the communications cabinet.

The Contractor shall run and connect power from the structure to the 0.5A circuit breaker and power line surge protector in the 334 traffic control cabinet. The Contractor shall wire supply power, power supply, surge suppressors, breaker, and radar detection unit in accordance with the manufacture's recommendations. The radar detection unit shall be wired to support RS-232 serial communications.

All holes shall be free of burs and sharp edges prior to the installation of all cable, conduit, and conduit nipples. All cable entrances in structures, conduits, and cabinets shall be sealed and waterproofed. All wiring and electrical connections shall be performed in conformance with the latest version of the NEC.

The Contractor shall configure the radar detection unit to detect all lanes, in accordance with the manufacture's recommendations.

The units shall be environmentally hardened for outdoor use with a temperature range of -10 to +80 degrees centigrade and available in one, two or four RS-232 port units. Also included at this location, a 120 volt AC to 24 volt DC power supply shall be included. This unit shall have a slim line DIN mountable case and be mounted to DIN rail in the 334 traffic control cabinet. The Contractor shall provide units which are compatible with current Department devices installed at various locations.

METHOD OF MEASUREMENT

The Microwave Vehicle Radar Detector will be measured by the actual number of units installed and accepted, and will include warranty, testing, documentation, radar detection unit, power supply, power source termination, surge suppressor, pole-mounting hardware communications cabinet, installation hardware, all necessary wiring, communication cables, labor and all other items necessary to complete the work. Testing will be measured by verification of vehicle detection, speed and volume of all lanes in the northbound direction with 90% accuracy.

BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price for the pay item listed below.

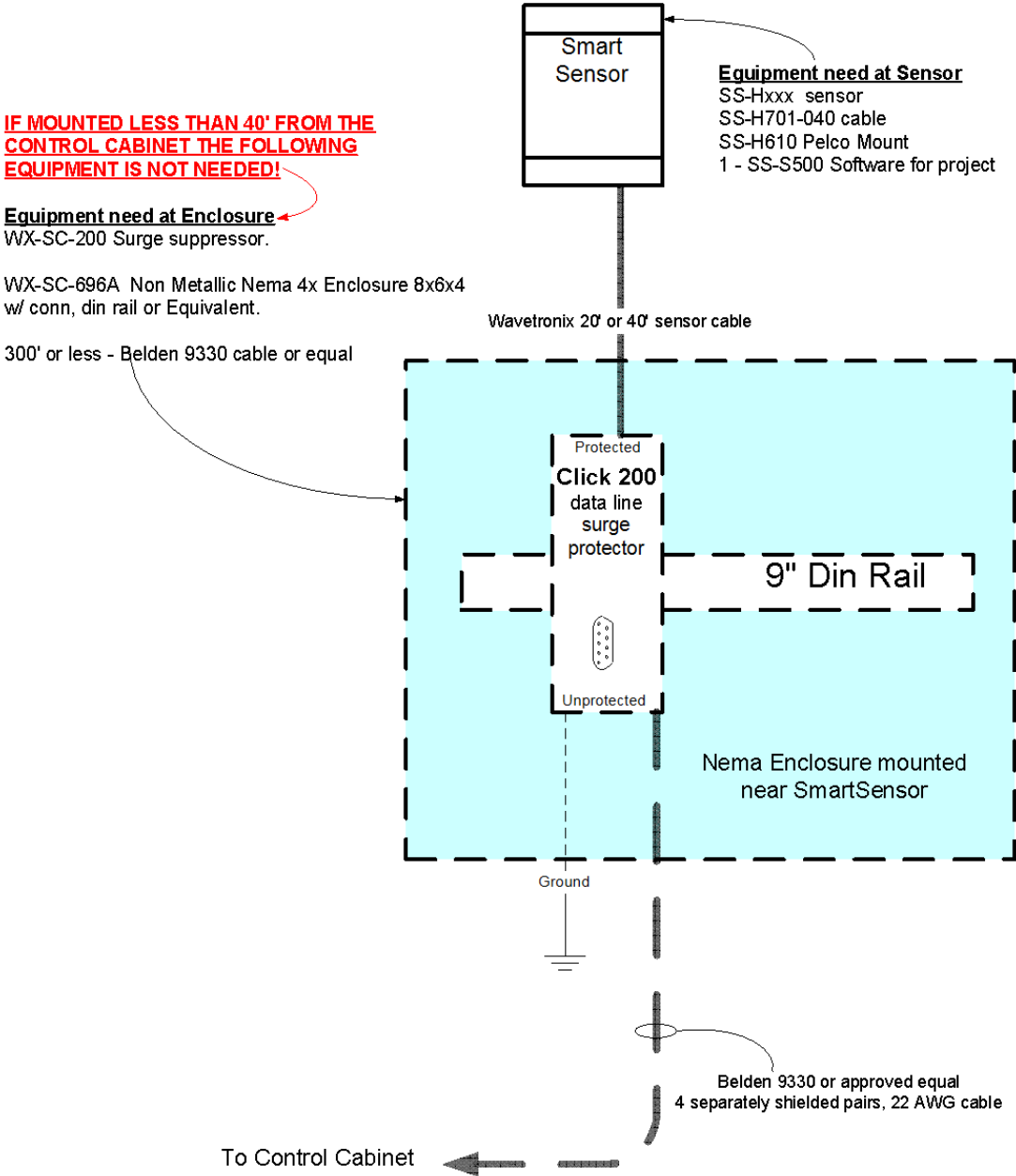
Payment will be made under:

Pay Item
Microwave Vehicle Radar Detector

Pay Unit
Each

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REVISION OF SECTION 614
MICROWAVE VEHICLE RADAR DETECTOR

Equipment drawing for each SmartSensor located less than 300' from control cabinet (as the wire travels).



**REVISION OF SECTIONS 614 AND 713
SIGN PANEL (CLASS III)**

Sections 614 and 713 of the Standard Specifications are hereby revised for this project as follows:

In subsection 614.04, delete the first paragraph and replace with the following:

Sign panel materials shall conform to Section 713 and to the details shown on the plans. Retroreflective sheeting shall be Type IV and Type XI as defined in the CDOT *Retroreflective Sheeting Materials Guide*, and shall conform to subsections 713.04 and 713.06 when applicable.

In subsection 713.06, delete the fourth paragraph and replace with the following:

For all permanent signs, the legend, borders, and background shall be Type XI.

Subsection 614.14 shall include the following:

<u>Pay Item</u>	<u>Unit</u>
Sign Panel (Class III)	Square Foot

**REVISION OF SECTION 626
PUBLIC INFORMATION SERVICES**

Section 626 of the Standard Specifications is hereby revised for this project as follows:

Subsection 626.01 shall include the following:

The Contractor shall provide the following public information services on an ongoing basis throughout the duration of the project:

At the preconstruction conference the Contractor shall introduce the Public Information Manager (PIM) for the project and present a public information plan and strategies or methods for communicating project activities. The Contractor shall prepare and submit a preliminary list of stakeholder groups and specific stakeholders that need to receive ongoing communication about the project.

The Contractor's PIM may be the Contractor Project Superintendent if approved by the Engineer after consulting with the Region Public Relations Manager, or it may be another approved project staff person. The PIM shall have good verbal and written communications skills. The identity of the PIM and the PIM'S qualifications shall be submitted to the Engineer five days in advance of the preconstruction conference.

The PIM shall be available on every working day, accessible and on call by cell phone or pager at all times and available upon the request of the Engineer at other than normal working hours. The PIM shall communicate with the Engineer daily.

The Contractor shall establish a Public Information Office (PIO) equipped with a telephone and an answering machine or answering device with the capability to record a message from the caller. This may be a cell phone, but shall be a local number. The PIO shall be equipped with a computer and an e-mail account. The PIO may or may not be located within the Contractor's regular office provided that the telephone has a local call number. The PIM shall record a friendly greeting on the project's published phone line each week, updating the message throughout the week, as necessary, depending on changes in work schedule, activities and traffic impacts. The recording shall include each week's forthcoming activities including work days, hours and expected traffic delays, posted detours, project completion date, and office hours. The PIM shall check the answering machine at least twice every calendar day, including weekends. The PIM shall respond to callers and e-mail inquiries as soon as possible, but at least within 24 hours. The PIM shall keep a logbook of all calls including the contact name, date of contact, date responded, the contact's comments, and the action the PIM took. A copy of this log shall be submitted to the Engineer every two weeks or more frequently, as requested by the Engineer.

The PIM shall maintain communications with businesses and individual residences, commuters, local government entities and all other stakeholders that are directly adjacent to and affected by the project, or that express interest in being informed. Using a communications method or strategy approved by the Engineer, the Contractor shall notify stakeholders about the project two weeks prior to beginning any lane restrictions or project activities. Depending upon project impacts, contact with stakeholders may be required daily, weekly, monthly or periodically throughout the duration of the project. Communications tools could include hand flyers, door hangers, newsletters, mailers, using e-mail distribution lists, etc. All public information correspondence and subsequent updates shall be submitted to both CDOT's Region Public Relations Manager and the Engineer 48 hours (two business days) before distribution, and will be approved by CDOT's Region Public Relations Manager before distribution..

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REVISION OF SECTION 626
PUBLIC INFORMATION SERVICES

Each communication tool shall include contact information, PIM's name, office phone, CDOT Web-site address with CDOT logo. Cell phone numbers and e-mail addresses shall be provided where service is available. The communication shall include the description of work, lane restrictions, a detour map if warranted, the anticipated start and completion dates, hours of operation and work schedule, and a Slow for the Cone Zone message. CDOT's Region Public Relations Manager will provide additional text for inclusion, if warranted.

The Contractor shall erect construction traffic signs with the dates the Contractor expects to initiate and complete construction and with the Contractor's public information office's or PIM's phone number at each major approach to the project. The signs shall conform to the requirements of Section 630 and shall be erected at least one week prior to the beginning of construction. These signs shall be updated if the project schedule changes, at no cost to the project.

The CDOT Region Public Relations Manager will write and distribute all News Releases to the media and handle all media relations and outreach unless otherwise directed by the Engineer.

The Contractor superintendent or PIM shall submit weekly lane closure reports to the Engineer and to the CDOT Region Public Relations Manager, using the template provided by the Engineer.

The Public Information Services Contact Sheet shall include the following:

Public Information Services Contact Sheet

Owners:

Colorado Department of Transportation Project Engineer

Name: Doug Liane

Address: 2000 S. Holly ST. Denver, CO 80222

Phone: 303-972-9112 Fax: 303-972-9114 Cell:

Email: Douglas.Liane@dot.state.co.us

Colorado Department of Transportation, Region Public Relations Manager

Name: Mindy Crane

Address: 4201 E. Arkansas Ave. Denver, CO 80222

Phone: 303-757-9469 Fax: 303-757-9153 Cell: 303-880-2136

Email: Mindy.Crane@dot.state.co.us

Colorado Department of Transportation, Colorado Traffic Management Center

425-C Corporate Circle, Golden, CO 80401

Phone: (303) 512-5830 Fax: (303) 274-9394

Other Contacts:

City or County of:

Phone: Fax: Email:

Fire Department:

Phone: Fax: Email:

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REVISION OF SECTION 626
PUBLIC INFORMATION SERVICES

Police Department:

Phone: Fax: Email:

Public Works Department:

Phone: Fax: Email:

Colorado State Patrol

Phone: Fax: Email:

Emergency Notification:

Subsection 626.02 shall include the following:

The Engineer will monitor the PIM and all public information services. When the Contractor provides acceptable public information services in accordance with these specifications, partial payments for the pay item Public Information Services will be made as the work progresses. These partial payments will be made as follows:

When 5 percent of the original Contract amount is earned, 25 percent of the amount bid for this item will be paid.

When 10 percent of the original Contract amount is earned, 40 percent of the amount bid for this item, less all previous payments, will be paid.

When 25 percent of the original Contract amount is earned, 50 percent of the amount bid for this item, less all previous payments, will be paid.

When 50 percent of the original Contract amount is earned, 60 percent of the amount bid for this item will be paid.

When 60 percent of the original Contract amount is earned, 70 percent of the amount bid for this item will be paid.

When 70 percent of the original Contract amount is earned, 80 percent of the amount bid for this item, less all previous payments, will be paid.

When 80 percent of the original Contract amount is earned, 90 percent of the amount bid for this item will be paid.

When 100 percent of the original Contract amount is earned, 100 percent of the amount bid for this item, less all previous payments, will be paid.

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REVISION OF SECTION 626
PUBLIC INFORMATION SERVICES

Failure to provide acceptable public information services will result in withholding of progress payment for this item. Continued failure to provide the services required will result in non-payment of the corresponding percentage of the original bid item and may result in suspension of the work in those areas affected until acceptable public information services are provided by the Contractor.

For the purpose of public information services, the term “original Contract amount” as used above, shall mean the amount bid for the construction items on this Contract, not including the amounts bid for Public Information Services and Mobilization, and “aggregate Contract amount earned” shall mean the net amount on the current monthly pay estimate, not including the amounts earned for Public Information Services and Mobilization.

Payment for Public Information Services will be full compensation for all fliers, public information office, telephone lines, and all other labor and materials required to complete the item, except signs. Signs will be measured and paid for in accordance with Section 630.

Payment will be made under:

Pay Item	Pay Unit
Public Information Services	Lump Sum

**REVISION OF SECTION 627
EPOXY PAVEMENT MARKING (SPECIAL)**

CONSTRUCTION REQUIREMENTS

Section 627 of the Standard Specifications is hereby revised for this project to include the following:

Delete subsection 627.05 and replace with the following:

Epoxy Pavement Marking (Special). Epoxy Pavement Marking (Special) shall be applied to the road surface according to the epoxy manufacturer's recommendations at 20 mils minimum thickness. Bead system shall be applied into the epoxy pavement marking by means of a pressurized bead applicator at the manufacturer's recommended application rate.

The surface area receiving marking shall be ground prior to placement of the Epoxy Pavement Marking (Special). This applies to new or existing concrete or asphalt pavements. The ground surface shall then be cleaned with a high pressure air blast to remove loose material prior to placement of the Epoxy Pavement Marking (Special). The grooved width for inlaid pavement marking shall be between 4 and 4-1/4 inches in width. The depth of the inlaid grooves shall be 80 mils \pm 5 mils below the surface of the existing pavement.

Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. The Contractor shall prevent traffic from traversing the grooves, and shall re-clean grooves, as necessary, prior to application of the Epoxy Pavement Markings (Special).

The Contractor shall grind only those locations on which pavement marking shall be applied on a daily basis. If a rain event occurs during grinding and marking application, a temporary lane line marking tab shall be placed while the pavement is drying prior to the marking application. Marking application can proceed when pavement is dry and has had no moisture for a minimum of 24 hours. The placement of tabs shall be every other lane line/skip or approximately 80 feet.

The primary and secondary beads shall be applied in a two drop operation in accordance with the manufacturer's recommendations. If manufacturer recommendations do not address this operation, then the rate of primary beads shall be 10 to 11 pounds per gallon of epoxy. The primary composite cluster shall be applied first from the bead dispenser directly behind the Epoxy binder application gun followed immediately by the application of the secondary beads from a second bead dispenser. The application rates of the primary and secondary beads shall be adjusted from these starting values until the minimum retroreflectivity values have been consistently achieved. The beads shall be applied in such a manner that the beads shall adhere and be embedded within the epoxy binder to produce a high reflective all weather pavement marking.

There shall be two types of glass and/or ceramic beads used for the Epoxy Pavement Marking (Special) reflective elements, a Primary bead which is a high performance, high reflective all weather bead and a Secondary standard glass bead. Beads will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02 in addition to the following requirements:

1) The primary bead shall be a composite cluster comprised of a core element and shall contain an outer shell containing elements surrounding it. The shell elements shall be permanently attached to the core element. The core and shell elements shall be manufactured from glass,

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REVISION OF SECTION 627
EPOXY PAVEMENT MARKING (SPECIAL)

ceramic, or silica. The primary element shall be coated by manufacturer's recommendations for application within Epoxy binder.

2) The secondary bead shall conform to the following specifications:

Gradation:

U.S. Mesh	Microns	% Retained	% Passing
18	1000	20 – 35	65 – 80
30	600	50 – 70	30 – 50
50	300	95 – 100	0 – 5

Roundness: Shall be a minimum of 85 % true spheres above the sieve 20 by visual inspection using test method FLH-520. All beads below the 20 sieve, must meet a minimum of 80% true spheres by ASTM Method D 1155.

Color / Clarity: Beads shall be colorless / clear and free of carbon residues.

Refractive Index: Minimum 1.50 by oil immersion method.

Air Inclusions: < 5% by visual count.

Hardness: All beads above the 20 sieve shall exhibit an average hardness of C70.5 when measured using the Rockwell C scale method and with a minimum sampling of 100 glass beads.

Crushing Strength: Beads above the 20 sieve shall exhibit an average crushing strength of not less than 60,000 psi when measured with the L/D^2 method and with a minimum sampling of 100 glass beads.

Coatings: Shall use manufacturer's recommended adhesion coating for optimum adhesion and embedment.

Chemical Resistance: Both the primary and secondary beads shall be resistant to hydrochloric acid, water, calcium chloride, sodium sulfide, acid, and magnesium chloride, and shall not develop any haze, dulling or darkening of the bead as tested per methods outlined in sections 4.3.6 to 4.3.9 of the TT-B Federal Spec. 1325C.

3) Primary and secondary glass beads shall be furnished in fully identified, separate containers and shall be free of extraneous materials or clumps. If the use of recycled post consumer glass is used in manufacturing of beads those recycled glass beads shall be manufactured from North American glass waste streams. The bead manufacturer shall submit a notarized certification to the department stating that North American glass waste streams were used in the manufacture of this specification.

Products will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02, and shall include that the materials conform to the following:

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REVISION OF SECTION 627
EPOXY PAVEMENT MARKING (SPECIAL)

- 1) Retroreflectivity. The applied finish system shall have an initial minimum dry retroreflectivity reading of 700 mcd·m⁻²·1x-1 for white and 500 mcd·m⁻²·1x-1 for yellow. The Contractor shall use an industry accepted and available Retro-meter for retroreflectivity readings and it shall be calibrated each day testing occurs. For information: (CDOT will be using a Delta LTL-X Retro-meter for retroreflectivity readings). CDOT will obtain retroreflectivity readings from the Contractor for each 1 mile of line placed or fraction thereof. CDOT will determine a random testing location for each 1 mile section of line placed or fraction thereof. Each test location shall represent that 1 mile of line placed or fraction thereof. At each random testing location two reflectivity readings will be taken on 11 different skip lines or 22 readings will be taken with a 440 foot section of the continuous line. Of those 22 readings the highest and lowest will be disregarded and the remaining 20 readings will be averaged and that average value will represent the reflectivity of that 1 mile section or fraction thereof. The contractor shall remove and replace at their expense each 1 mile of line placed or fraction thereof where the test result from that random location fails the minimum retro reflectivity reading.

The retroreflectivity readings shall be taken between two and three days after the marking is tack free. Prior to taking reflectivity readings, the Contractor shall remove at the retroreflectivity reading locations any excess beads placed during marking application.

Applied markings shall have uniform mil thickness and bead distribution across the entire width of the line. Unless otherwise shown on the plans, typical pavement markings shall conform to the shapes and sizes as shown on Standard Plan S-627-1.

The Contractor will be required to submit to CDOT certification from the manufacturer that the installed epoxy binder and both the primary and secondary beads have been installed in accordance with this specification and with their recommendations and has achieved the minimal retroreflectance values stated herein. If the pavement marking system is comprised of multiple manufacturers, then all manufacturers will be required to affirm to the certification. A manufacturer's representative shall be onsite at the installation of the epoxy binder, primary bead, and secondary bead materials to identify areas of the installation falling below the minimum manufacturer's recommendations and these specifications to assist in the calibration of equipment, set up of equipment and the proper adjustment of equipment during installation to achieve the minimums outlined herein. The cost of the manufacturer(s) representation will not be measured and paid for separately but shall be included in the cost of the work.

Subsection 627.13 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Epoxy Pavement Marking (Special)	Gallon

The work to groove the asphalt or concrete and clean the grooving residual or debris will not be measured and paid for separately but shall be included in the work.

The primary and secondary beads will not be measured and paid for separately but shall be included in the cost of the Epoxy Pavement Marking (Special).

Temporary markings will not be measured and paid separately, but shall be included in the cost of work.

**REVISION OF SECTION 630
IMPACT ATTENUATOR
(TRUCK MOUNTED ATTENUATOR) (TEMPORARY)**

Section 630 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 630.01 shall include the following:

This work shall consist of furnishing, operating, and maintaining a truck with a mounted attenuator.

Subsection 630.09, shall include the following:

Truck Mounted Attenuator. The Contractor shall supply a vehicle with a truck mounted attenuator approved by the FHWA to meet NCHRP 350 criteria for level TL-3 collisions. The attenuator shall be mounted to a suitable truck in a manner meeting the Manufacturer's specifications. The truck shall also be furnished with a roof mounted Advance Warning Flashing or Sequencing Arrow Panel (B Type). The trucks may be used when setting up the work Zone and shall be parked in the activity area protecting the construction work when work begins.

Subsection 630.13 shall include the following:

Maintenance, storage, operation, and all repairs of Truck Mounted Attenuator and vehicle shall be the responsibility of the Contractor.

Subsection 630.15 shall include the following:

Truck Mounted Attenuators shall be measured by the Unit. The Contractor will be paid for the number of trucks required in the plans and available for use.

Subsection 630.16 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Impact Attenuator (Truck Mounted Attenuator) (Temporary)	Each

Payment will be full compensation for all labor, materials and equipment required to operate and maintain this truck for the duration of the project, including the attenuator and flashing panel.

**REVISION OF SECTION 630
PORTABLE MESSAGE SIGN PANEL**

Section 630 of the Standard Specifications is hereby revised for this project as follows:

Subsection 630.01 shall include the following:

This work includes furnishing, operating, and maintaining a portable message sign panel.

Add subsection 630.031 immediately following subsection 630.03 as follows:

630.031 Portable Message Sign Panel. Portable message sign panel shall be furnished as a device fully self contained on a portable trailer, capable of being licensed for normal highway travel, and shall include leveling and stabilization jacks. The panel shall display a minimum of three - eight character lines. The panel shall be a dot-matrix type with an LED legend on a flat black background. LED signs shall have a pre-default message that activates before a power failure. The sign shall be solar powered with independent back-up battery power. The sign shall be capable of 360 degrees rotation and shall be able to be elevated to a height of at least five feet above the ground measured at the bottom of the sign. The sign shall be visible from one-half mile under both day and night conditions. The message shall be legible from a minimum of 750 feet. The sign shall automatically adjust its light source to meet the legibility requirements during the hours of darkness. The sign enclosure shall be weather tight and provide a clear polycarbonate front cover.

Solar powered message signs shall be capable of operating continuously for 10 days without any sun. All instrumentation and controls shall be contained in a lockable enclosure. The sign shall be capable of changing and displaying sign messages and other sign features such as flash rates, moving arrows, etc.

Each sign shall also conform to the following:

- (1) In addition to the onboard solar power operation with battery back-up, each sign shall be capable of operating on a hard wire, 100-110 VAC, external power source.
- (2) All electrical wiring, including connectors and switch controls necessary to enable all required sign functions shall be provided with each sign.
- (3) Each sign shall be furnished with an operating and parts manual, wiring diagrams, and trouble-shooting guide.
- (4) The portable message sign shall be capable of maintaining all required operations under Colorado mountain-winter weather conditions.
- (5) Each sign shall be furnished with an attached license plate and mounting bracket.
- (6) Each sign shall be wired with a 7-prong male electric plug for the brake light wiring system.

Subsection 630.13 shall include the following:

The portable message sign panel shall be on the project site at least 7 calendar days prior to the start of active roadway construction. Maintenance, storage, operation, relocation to different sites during the project, and all repairs of portable message sign panels shall be the responsibility of the Contractor.

Subsection 630.15 shall include the following:

Portable message sign panels will be measured one of the two following ways:

- (1) By the actual number of days each portable message sign is used on the project as approved by the Engineer.
- (2) By the maximum number of approved units in use on the project at any one time.

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REVISION OF SECTION 630
PORTABLE MESSAGE SIGN PANEL

Subsection 614.16 shall include the following:

Pay Item	Pay Unit
Portable Message Sign Panel	Each

FORCE ACCOUNT ITEMS

DESCRIPTION

This special provision contains the Department's estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at \$5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

<u>Force Account Item</u>	<u>Estimated Quantity</u>	<u>Amount</u>
F/A Minor Contract Revisions	F.A.	\$ 200,000*
F/A Asphalt Pavement Incentive (HMA)	F.A.	\$ 200,000
F/A Fuel Cost Adjustment	F.A.	\$ 491,000
F/A Roadway Smoothness Incentive Payment	F.A.	\$ 200,000
F/A Asphalt Cement Cost Adjustment	F.A.	\$ 250,000
F/A Interim HMA Surface Repair	F.A.	\$ 40,000
F/A On the Job Trainee	Hour	\$ 960
F/A ESB Program	F.A.	\$ 7,500
F/A Erosion Control	F.A.	\$ 5,000*

F/A Asphalt Pavement Incentive - Asphalt Pavement Incentive will be made in accordance with Standard Special Provisions of Sections 105.05- Conformity to the Contract of Hot Mix Asphalt and Revision of Section 105 – Conformity to the Contract of Hot Mix Asphalt(Voids Acceptance).

F/A Roadway Smoothness Incentive Payment – Roadway Smoothness Incentive will be made in accordance with Revision of Section 105 – Hot Mix Asphalt Pavement Smoothness.

F/A Asphalt Cement Cost Adjustment - Asphalt Cement Cost Adjustment will be made in accordance with Revision of Section 109 Asphalt Cement Cost Adjustment (Asphalt Cement Included in the Work).

F/A Interim HMA Surface Repair – This work consists of placing and compacting a machine scratch course in locations as directed by the Engineer. The machine scratch course may be used once the Contractor meets all specification requirements for the Revision of Section 202 – Removal of Asphalt Mat (Planing) and irregularities such as, but not limited to, delamination and raveling exceeding 10 percent within any ½ mile segment that are encountered prior to the specified time of the overlay.

F/A Erosion Control – This force account is to pay for Topsoil, Seeding (Native), Mulching (Weed Free), Mulch Tackifier and any other Erosion Control items the Erosion Control Supervisor will need during the duration of this project. All items shall be pre-approved by the Engineer prior to installation or they will be at no cost to the project.

TRAFFIC CONTROL PLAN - GENERAL

The key elements of the Contractor's method of handling traffic (MHT) are outlined in subsection 630.10(a).

The components of the TCP for this project are included in the following:

- (1) Subsection 104.04 and Section 630 of the specifications.
- (2) Standard Plan S-630-1 and Standard Plan S-630-2, Traffic Controls for Highway Construction.
- (3) Schedule of Construction Traffic Control Devices.
- (4) Signing Plans.
- (5) Construction phasing details.
- (6) Detour Details.
- (7) Other.

Unless otherwise approved by the Engineer, the Contractor's equipment shall follow normal and legal traffic movements. The Contractor's ingress and egress of the work area shall be accomplished with as little disruption to traffic as possible. Traffic control devices shall be removed by picking up the devices in a reverse sequence to that used for installation. This may require moving backwards through the work zone. When located behind barrier or at other locations shown on approved traffic control plans, equipment may operate in a direction opposite to adjacent traffic.

CDOT may have entered into operating agreements with one or more law enforcement organizations for cooperative activities. Under such agreements, at the sole discretion of CDOT, law enforcement personnel may enter the work zone for enforcement purposes and may participate in the Contractor's traffic control activities. The responsibility under the Contract for all traffic control resides with the Contractor and any such participation by law enforcement personnel in Contractor traffic control activities will be referenced in either the Special Provisions or General Notes of the plans depending on whether the Contractor is to hire local law enforcement or if CDOT is contracting with Colorado State Patrol for uniformed traffic control. Nothing in this Contract is intended to create an entitlement, on the part of the Contractor, to the services or participation of the law enforcement organization.

Special Traffic Control Plan requirements for this project are as follows:

During the construction of this project, traffic shall use the present traveled roadway unless identified on the plans or approved by the Engineer.

The Contractor shall not have construction equipment or materials in the lanes open to traffic at any time, unless approved by the Engineer.

During the resurfacing work, only one lane may be closed to traffic at any time unless approved by the Engineer. Traffic shall not be delayed for more than 5 minutes or as directed by the Engineer.

The Contractor shall not perform any work requiring lane closure on the roadway between the hours of 5:30 am and 8:00 pm or as directed on C470.

At least one week prior to starting construction, the Contractor shall notify the Engineer of the date the Contractor intends to start construction.

All costs incidental to the foregoing requirements shall be included in the original contract prices for the project.

Utilities

The known utilities within the limits of this project are:

UTILITY	CONTACT/EMAIL	PHONE/FAX
Xcel Energy Application for Gas & Electric Services	BCLCO@xcelenergy.com	1-800-628-2121 1-800-628-2521 Fax
CDOT ITS 425C Corporate Circle Golden, CO 80401	Jill Scott Jill.k.scott@dot.state.co.us	303-512-5805 303-512-5878

The work described in these plans and specifications requires full cooperation between the Contractor and the utility owners in accordance with Subsection 105.11 in conducting their respective operations, to complete the utility work with minimum delay to the project.

PART 1 - CONTRACTOR SHALL PERFORM THE WORK LISTED BELOW:

Coordinate project construction with the performance by the utility owner of each utility work element listed in Part 2 below. Perform preparatory work specified in Part 2 for each utility work element. Provide an accurate construction schedule that includes all utility work elements to the owner of each impacted utility. Provide each utility owner with periodic updates to the schedule. Conduct necessary utility coordination meetings, and provide other necessary accommodations as directed by the Engineer. Notify each utility owner in writing, with a copy to the Engineer, prior to the time each utility work element is to be performed by the utility owner. Provide the notice the number of days specified in Part 2 immediately prior to the time the utility work must be begun to meet the project schedule.

Prior to excavating, the Contractor shall positively locate all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule of construction. The Contractor shall modify construction plans to avoid existing underground facilities as needed, and as approved by the Engineer. Please note that UNCC marks only its members' facilities – Other facilities, such as ditches and drainage pipes may exist, and it is the Contractor's responsibility to investigate, locate and avoid such facilities.

Provide traffic control, as directed by the Engineer, for any utility work by the utility owner expected to be coordinated with construction. However, traffic control for utility work outside of typical project work hours shall be the responsibility of the utility owner.

Perform each utility work element for every utility owner listed here in Part 1. Notify each utility owner in advance of any work being done by the Contractor to its facility, so that the utility owner can coordinate its inspections for final acceptance of the work with the Engineer.

NO UTILITY WORK EXPECTED.

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Utilities

PART 2 - UTILITY OWNERS SHALL PERFORM THE WORK LISTED BELOW:

Although the CDOT Contractor shall provide traffic control for utility work expected to be coordinated with construction, traffic control for utility work outside of typical project work hours shall be the responsibility of the utility owner. The utility owner shall prepare and submit to the CDOT Engineer a Method of Handling Traffic for utility work to be performed outside typical project work hours. The utility owner shall obtain acceptance of the Method of Handling traffic from the CDOT Engineer prior to beginning the utility work to be performed outside typical project work hours.

NO UTILITY WORK EXPECTED.

GENERAL:

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavating or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least two (2) business days, not including the actual day of notice, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at phone no. **811** to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective owner. Utility service laterals shall also be located prior to beginning excavation or grading.

The location of utility facilities as shown on the plan and profile sheets, and herein described, were obtained from the best available information.

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work.